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The Scrap Problem

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THE SCRAP PROBLEM[1]

The chief purpose of this article is to discuss the methods to be used in reducing losses from scrap, with particular reference to plants in the electrical industry of some size.

Every manufacturing plant, whether small or large, has the problem of scrap to face. It may be either simple or complex, depending upon the size of the plant, the line of product and the variety of materials used in manufacturing. The contributing causes are defective and unsuitable material or product which falls short in performance of the service it is intended for; poor workmanship, accidental damage, etc. Briefly, the problem of scrap is always present, either as a result of operations through which the material passes, or defects in the material and product, or obsolescence.

Since all material that is scrapped represents an increase in cost, it is essential that efficient methods be used in handling it, so that scrap may be kept at a minimum, and correct accounting followed for the purpose of allocating the loss to individual lines of product. It is also true that correct accounting and comprehensive reports often point out inefficiency in manufacturing operations. In general it might be said that the higher the percentage of scrap, the larger is the loss of material, labor and overhead, and consequently more expense is necessary to handle the increased quantity of scrap for disposition.

To properly discuss the subject and to present a plan for taking care of the scrap problem, it is necessary to start with the source of scrap and follow it through the various stages until it is finally disposed of and properly accounted for.

I.—SOURCES OF SCRAP.

Scrap can be traced to three main sources—defective or un-

[1] The Association has issued three previous publications dealing with scrap, Volume I, Number 6, entitled "Distribution of Defective and Spoiled Material Costs," by C. H. Smith; Volume II, Number 13, entitled "A Method of Accounting for Scrap," by C. B. Williams, and Volume III, Number 9, entitled "Methods of Accounting for Waste in a Cotton Spinning Mill," by George D. Klimmer.

suitable material purchased outside, avoidable scrap and unavoidable scrap.

1. Defective or Unsuitable Material Purchased Outside.

Defective material purchased outside can either be corrected and used or rejected and returned to the vendor. If it can be saved, the cost of correction should be charged back to the vendor, but this can be done only through prearranged agreement. Otherwise it is the usual business practice to reject the material and bill it back to the vendor. However, any labor performed and expense entailed before defects are found represents a loss because such items, as a rule, cannot be charged back.

Ability to identify the vendor is of importance, particularly when similar material is purchased from a number of concerns, because such material can only be returned when the vendor is positively known. One method of identification is to assign different symbols to the vendors requiring that the material they supply should bear that symbol, or such symbol can be stamped on the material when it is received.

Defective material purchased outside, even though it can be rejected and billed back, is a source of loss because of the incidental expense. But by exercising care in placing orders with those vendors only who supply the best materials, using positive means of identification, and promptly rejecting defective material, it should not be difficult to keep the loss from this source at a low figure.

2. Avoidable Scrap.

The scrap grouped under the general heading of avoidable scrap can be classified according to the following causes:

a. Obsolete (due to change in design), b. Surplus (due to over-ordering, ordering in error, or unbalanced production), c. Spoiled (due to errors in drawings), d. Spoiled (fault of operator), e. Spoiled (fault of operating conditions), f. Spoiled (from another department), g. Broken or lost, h. Defective (purchased outside), i. Failure in test, j. Due to cancellation of order or requisition, k. Extra labor (all labor, which would not be necessary under perfect manufacturing conditions), and l. Returned Product (not marketable).

The classification of causes can be either reduced or extended to suit the requirements of the management. But it is desirable that it should be broad enough to permit easy analysis, and thereby assist in reducing or eliminating the loss by removing the cause.

Avoidable scrap is the most important class of scrap, in that its cost less the salvage value of material means a total loss.

3. Unavoidable Scrap.

The term unavoidable scrap is to some extent self-explanatory. It includes worn out tools and equipment and all natural scrap, briefly all scrap other than that covered by the foregoing two broad classes. It might be well to arrange unavoidable scrap into three groups, and to consider each separately.

a. Obsolete and worn out tools and equipment when removed from service should be either put in shape and offered for sale to second-hand dealers, or disassembled and all good parts placed in storage as spare supply parts for similar equipment in active service. Only equipment and parts for which no use or ready sale can be found should be considered as unavoidable scrap.

b. Product that has been used for experimental purposes can occasionally be remodeled and sold as new product. When this is not practicable, it should be disassembled and all good parts placed in active stock and the remaining parts scrapped.

c. Borings, turnings, clippings, short ends, sweepings, etc., usually comprise the largest percentage of the total quantity of unavoidable scrap handled. There is generally no apparent loss connected with this group of scrap, yet it may be worth while to inspect it closely to determine whether it is really unavoidable. It may be found that the maximum use is not made of raw material. This may lead to transferring short ends from a department where they are useless, to another where they can be used to advantage. It may be found that by closer estimating of sizes of material used, correct proportioning of standard stock and eliminating wasteful practices, a reduction of scrap is possible, with a consequent reduction in material costs.

More could be said about the sources of scrap, and further classification of causes which lead to loss could be discussed in detail, but that is not the purpose of this article. As stated before, its intent is rather to dwell upon *methods* to be applied for the reduction of loss from scrap.

II.—HANDLING SCRAP.

Scrap is usually looked upon as a nuisance. The word "scrap" itself implies something negligible and is conducive to indifference in handling, which leads to inefficiency and results in not obtaining the full value for the produced scrap. It is almost as important to handle scrap efficiently, as it is to prevent it. Scrap should usually stand out as a red light danger signal with respect to production,

but, when once produced, it should receive sufficient attention because of a threefold effect:

a. Carefulness in handling scrap acts suggestively on the workers, leading to good habits such as tidiness, attentiveness and a better attitude towards work in general. This influence becomes an indirect factor in promoting higher efficiency.

b. Careful handling will mean no scrap lying around which takes up valuable working space and ties up capital.

c. Careful segregation at the source will reduce the cost of preparing scrap for disposition, and will also assist in obtaining better prices, thereby reducing the net loss from scrap.

Practically all scrap has a value in the scrap market when properly segregated into grades of unmixed and uniform quality. But mixed scrap brings comparatively only very low prices. For these reasons proper segregation at the source can not be too highly recommended. Of course, it would be poor economy to expend any money or effort in keeping scrap segregated, where the benefits derived would be offset by the expense of handling it.

The following outline of a system of handling scrap is probably not ample enough in scope to suit all industries, but it is adaptable to many, and more especially to the electrical industry, and is intended to meet the requirements of plants of some magnitude.

1. Reporting Defective Material Purchased Outside, and Spoiled or Obsolete Products and Parts (Avoidable Scrap).

In nearly every plant it is the practice to pass all raw material and product through an inspection routine. It would seem therefore that the inspector is the logical individual to report the case and to determine by cöoperating with all concerned the advisability of saving the material or product through correction, or of passing it on for other disposition.

To facilitate his work, the inspector can be provided with a form especially designed for reporting defects, obsolescence and all other causes. A carefully established list of causes can be printed on the form. The inspector should either put a check mark, or preferably use a punch to indicate the respective cause.

Form 1 is a scrap ticket which includes the ideas expressed above, and also shows the other information usually required to make the report complete. The scrap ticket is prepared in quadruplicate, each copy being of a distinctive color to make distribution easy. The form is serially numbered for the purpose of accounting for each set used. The following outline of the routine through

All Scrap tickets must be accounted for. Send used tickets to

SCRAP TICKET N° 000

Dept. Date 19

✓	Passed by	Shop Order N° Requisition N°	From
	Check Cause involved		
	Obsolete		
	Change in design	Name of Part	Req. N°
	Surplus material	Class or Type of Product	Name or Stock No
	Spoiled		
	Error in drawings	Operations	Material
	Spoiled		
	Fault of operator		Quantity
	Spoiled, Fault of operating conditions	Recommendation	Weight
	Spoiled on Dept.		Cost of Mat'l
	Broken or lost in Dept.		Piece Work
	Inspection		
	Purchased outside	Reason detailed	Day Work
	Failed in test		Overhead
	Cancellation of Order or requisition		Total Cost
	Extra Labor		Scrap Value
	Returned Product		LOSS
Signed Inspector		Approved Foreman	
Disposition by foreman		Labor ticket wanted	Piece N°
			Original
Signed		Complete part wanted	Signed Rec'd Date
		Stock wanted	Sent Date

Form 1, Size (8 x 5½)

which the ticket passes will readily show the important function it performs.

a. The inspector sends the four copies to the foreman, who in the majority of cases can immediately decide what action is to be taken.

b. All four copies should then be forwarded to the cost clerk for filling in of cost figures.

c. The copies are then sent to the production clerk for reordering material, figuring percentage of spoiled parts, estimating delays, etc.

d. The copies next go to the stock room for replacing spoiled material and for passing it into production.

e. The copies are then returned to the foreman for the issuing of labor tags to cover any additional labor. The intent is, that even though material should be passed out to the operator through some irregularity, no labor could be performed on it, until a labor ticket authorized by a waste ticket, is issued.

f. Finally the copies are distributed from the foreman's office. The first copy is sent to the cost department for calculating the percentage of loss to billing, and for preparing waste reports.[1] The second copy is sent to the salvage department for checking

[1]This feature is discussed at length under the heading of absorbing scrap losses in costs on page 15.

scrap received and for crediting the respective departments. The third copy is sent to the department or subforeman responsible for the loss. In the case of outside purchased material, this copy is sent to the purchasing department or individual handling rejections. The fourth copy remains in the foreman's file.

2. Tagging.

When material or product is found by the shop inspector to be defective, obsolete or unfit for use, his first step is to tie a tag to it, so that all further operations on it will be stopped until its final disposition is determined upon.

For easy distinction it is preferable to have three differently colored tags, a green tag for defective material purchased outside, a blue tag for all other defective material, which can possibly be saved through correction, and a red tag for material that is ordered scrapped.

Material purchased outside that has been "green tagged" as defective should not be removed from the shop floor, except on orders from the foreman or inspector. When correction is decided upon, the tag is removed by the inspector and the material is passed into production. When material is to be returned to the vendor the foreman issues an order for its delivery to the shipping department. When the vendor agrees to stand the loss, less scrap value, the green tag is removed by the inspector and a red tag is attached for delivery to scrap storage.

"Blue tagged" material is held until the practicability of correction is decided. Then the tag is removed by the inspector and the material is passed into production or is replaced by a red tag and the material is delivered to scrap storage.

All "red tagged" material can be immediately removed from the floor to scrap storage.

3. Reporting and Tagging Natural Scrap (Unavoidable Scrap).

Natural manufacturing scrap does not need the attention of an inspector, but in a large shop there should be someone delegated to see that it is properly handled, i. e., well segregated, promptly collected, tagged, reported for delivery and removed from the floor. This individual should understand the classification of scrap grades in order to do this work intelligently.

One of the requisites for the efficient handling of natural scrap is the complete reporting of all transfers, chiefly for the purpose of allowing full credit at scrap value to the manufacturing departments.[1]

[1] This point is explained under the heading Accounting for Scrap on page 14.

Reporting transfers can be simplified by the use of a special form. Form 2 shown below will probably be adaptable in most plants without much modification.

SCRAP TRANSFER SLIP No 000

From Dept. To Dept. Date 19

Symbol	Quantity	Description	Weight	Price	Per	Amount

Signed

Form 2, Size (8 x 4)

The information called for in the headings of the columns on the form is considered necessary for correct accounting.

This scrap transfer slip can be issued either in triplicate or quadruplicate and in serially numbered sets.

When filled out, the original is sent to the department or individual handling all scrap accumulations, the duplicate is retained in the originating department and the triplicate, made of heavy paper, is attached to the scrap and acts as a transportation tag. When it is desirable to consider the scrap as a direct credit to costs, a fourth copy can be supplied to the cost clerk for recording the scrap value in the cost ledger.

4. Collecting Scrap.

Systematic collection of scrap is important because it will prevent scrap from lying around, getting mixed and occupying valuable floor space. No specific method can be suggested as the best one to fit all cases because of the great variety of scrap. However, the principle that collection of scrap should be carried on systematically and economically, is applicable everywhere. One fact should be borne in mind, namely, that the quantity of high valued non-ferrous metals, such as copper, brass, aluminum, etc., is usually small. Therefore more care can and should be exercised in handling them to retain their high value. The ferrous scrap, such as iron and steel, is of low value and greater quantity, and requires more economical methods of handling.

5. Accumulation Space.

Proper spaces should be provided in shops where scrap can be accumulated for transfer to scrap storage, and nothing but scrap should be accumulated there. For easy checking and to prevent loss of good material, the red tagged scrap should be kept in separate containers and positively should not be mixed with natural scrap. This separation of the two classes will not entail any more expense and will simplify the handling and accounting for the natural scrap.

6. Containers.

The usual practice of collecting scrap in containers of a variety of shapes and sizes should be discouraged because of the following reasons:

a. They do not permit correct estimating of weights of scrap; b. they are inconvenient for handling in shops and transportation; c. they are unsafe and uneconomical, particularly wooden boxes, as they often break down with heavy loads, entailing the expense of reloading; and d. they cannot be economically stacked for storage, and thus occupy more space than is necessary.

Although the initial cost of uniform scrap containers may be looked upon as an unnecessary expense, it will be found that in the end, they will prove most economical, because they will be of assistance in handling scrap efficiently.

For collecting non-ferrous chips, clippings, etc., at the place where produced, each operator should be supplied with one or more small containers, and be held responsible for keeping the various grades of scrap separate and free from refuse. At regular intervals a laborer should empty the operators' containers into larger ones. The large containers should be labeled according to the grades they are intended to hold. Marks or level lines should be painted on them to indicate the weight of contents when filled to the respective mark or line. As a rule, scrap of uniform size and nature will run very near alike in weight. Thus the system of always using the same kind of container with level lines for the same grade, will eliminate the necessity of weighing scrap.

7. Accumulating Large Lots of One Grade Scrap.

The expense of handling and accumulating large quantities of steel and iron clips can be held at a minimum if large bins are constructed near a railroad track and adjacent to buildings where the chips are produced. The chips can be shoveled from floors into easily wheeled, large capacity tilting barrows and transferred to such bins for storage until enough is collected for carload lot shipments. Where the location does not allow such an arrangement,

the chips should be collected in large containers for transfer to scrap storage, and should be emptied and returned to the shops. It may happen that the space on the shop floor is limited so that the use of large containers on the floor is prohibitive. This can be overcome by providing holes with strong trap doors in the main aisle which is usually kept open and by putting the containers in these holes under the floor. They should only be removed when they are full. A drop-bottom on such containers makes emptying easy. This is feasible only where crane service is available.

Scrap that is very bulky, irregular in shape, long and assembled will have to be handled as individual pieces or lots, and weighed either in shops where produced or on track scales when shipped. Even sweepings from shop floors have a certain value if they contain any metal. They can be put through a rotating mechanical sifter and graded into sweepings No. 1, 2, 3, etc., according to the percentage of metal contents.

8. Facilities and Equipment.

Many devices are used to reduce scrap to a convenient shape for consumption and shipping. The most noteworthy are the presses for baling skeleton punchings, wire, etc. The bales are often loaded directly into railroad cars by conveyor. Shears are used for cutting long scrap to charging sizes; magnetic separators for removing iron and steel from non-ferrous metals; lifting magnets for handling iron and steel; melting pots and dross reducing furnaces for reclaiming tin, lead, zinc, etc., scrap and alloys derived therefrom.

There are other devices in common use, some of which are developed to meet particular requirements.

III.—DISPOSITION OF SCRAP.

Scrap storage was mentioned in the preceding paragraphs. The term might be explained. It is an open space or building where scrap is accumulated until it is used or sold. In small factories it is usually a small open space. Larger factories should have a definite storage place where scrap is accumulated and prepared for profitable disposition. When the value of scrap disposed annually runs into large figures, then the establishment of a salvage department provided with building and adequate equipment is the most satisfactory solution.

1. The Salvage Department.

The duties of the salvage department are first, to prevent excessive scrapping at the source and second, to obtain the highest value with the least effort and expense for the scrap produced. It

should be in charge of someone who will give his undivided attention to the scrap problem to forestall the undesirable attitude where no one knows much about scrap, and, therefore, nobody cares.

Should the volume of scrap be very large and the causes of loss numerous and complex, then such a department could be further divided into two distinct branches, one with particular duties of keeping scrap at a minimum and the other with the duty of handling scrap physically and preparing it for the market. Both branches, however, are so closely related that it is wise to place them under one head.

It is generally and instinctively known that scrapping usually means a loss, and in most cases some effort is made by those directly responsible for it, towards the prevention of reoccurrence. But possibilities of increasing the value of scrap sold are not as well known and frequently not even realized. Here is the opportunity for such a department to prove its worth. The underlying facts to keep in mind are, to know the scrap; its composition if it is an alloy; and to find a good market for it. Wherever practicable, the market value of scrap can then be further increased by preparing it to meet the consumers' requirements as scrap in shape for direct consumption will bring the highest price.

Based upon this point of view a salvage department can be constituted as a self-supporting organization, assessed with overhead and operated on an equal footing with producing departments. It should be invested with sufficient authority to induce better teamwork with other departments. Such an organization will relieve others from duties which are considered only side issues and hence often neglected. It will also be in better position to perform the following specialized functions:

a While not relieving anyone from responsibility regarding conservation of material, it will analyze the causes of scrap and waste, based on information gathered from the scrap tickets, and will suggest means of reduction or possible elimination of loss.

b Supervise handling of scrap in shops, paying particular attention to segregation and assist in developing inexpensive and efficient methods for collecting and transporting.

c Prepare scrap for disposition, being on the alert to reclaim and place back into production all that is practicable, before selling any to dealers.

d Find markets and sell all surplus scrap, making use of trade journals, both to advertise the scrap and to find dealers wanting particular kinds of scrap and willing to pay the highest price. Should this be impracticable, then at least the scrap should be sold to selected dealers who are interested only in particular

classes of scrap. All sales of scrap should be conducted by invitations for competitive bids. A tabulated record of bids to be submitted to the management for approval of sales should be kept. Upon the approval of a sale, two serially numbered copies of a sale list should be prepared showing the grades of scrap sold under each purchaser's name. One copy on which prices are omitted is sent to the shipping department. The other copy on which the sale prices are shown is forwarded to the accounting department to be used in connection with billing when shipment is made. The serial number should appear on the memorandum of shipment so that the shipment can be identified in the accounting department and the correct prices used for billing.

(e) Deliver scrap already packed, and preferably loaded in service cars and furnish a tally sheet of car and package contents to the shipping department. The sale list number should appear on each tally sheet to assist in checking shipment and recording it on the memorandum of shipment. To prevent errors in loading and shipping a wrong grade of scrap, the items on the tally sheet should be checked against a scrap inventory record which is compiled at the time of packing scrap. The packages, before being put in storage awaiting shipment, are numbered and marked with contents, gross, tare and net weights, and are entered in the scrap inventory book in numerical order. A page of this book is reserved for each grade of scrap.

(f) Keep records of scrap received and disposed, compiling data and submitting monthly summaries to the accounting department for posting in the control accounts.

IV.—RECORDS AND REPORTS.

The last paragraph above suggests records and reports. The following are considered more or less essential.

(1) One class of records are *summary sheets* on which the weights of scrap received shown on the scrap transfer forms and scrap tickets are to be compiled by departments and distributed according to grades. Totals for each department should then be recapitulated on one sheet and forwarded at the end of the month to the accounting department for crediting the respective departments with scrap value and charging the scrap account.

(2) A scrap ledger should be maintained in the salvage department for debiting scrap classification accounts with scrap received (from summary sheets), and crediting the same with transfers and shipments of scrap (from material transfer slips and memos. of shipment). A page is started in the ledger for each grade of scrap. On the left page all receipts of the grade are posted showing: (a) the date of receipt, (b) summary sheet number, (c)

department received from, (d) weight, (e) price, and (f) amount. On the right hand page all transfers or shipments are posted in the same order, showing the transfer slip or memo. of shipment number and the purchaser's or consumer's name. The difference between the *weights* appearing on both sides at the end of a month should represent the weight of that particular scrap that is on hand. In this manner a book inventory of scrap on hand is maintained. This record will also serve for comparing prices on various shipments.

(3) A record of purchasers can be maintained for statistical purposes, showing the kind of material they purchase, quantity, price and amount. The totals of this record should balance with the totals of grades transferred or shipped during the month, as posted in the ledger.

(4) A car record book in which all shipments are entered in numerical order of the memo. of shipment and showing all car numbers will be found valuable for tracing back to any data regarding outgoing scrap.

(5) A monthly report of disposition of scrap should be compiled by the salvage department, showing under each purchaser's name the quantity, price and amount of each grade purchased, also the total weight of scrap disposed and total proceeds for the month. Opposite the price obtained for each grade, it might be well to show the percent it is of the basic market quotation price, (for example: if copper was quoted at 13c. lb. on date of sale and a grade of copper scrap was sold at 11c. lb., 84.61% of the market price was obtained). This ratio of price received for scrap to market price quoted for the respective raw material, will always show where the highest prices are obtained, regardless of the drop or rise in market quotations.

(6) An annual summary of scrap can be compiled in two sections, one showing total weight and value of scrap sold to each purchaser, and the other total quantities and value of each grade of scrap disposed during the year. Both the monthly and the annual report are not essential but may prove valuable for comparison.

(7) A scrap price list for crediting should be maintained. The prices should be based on market quotations minus the actual cost of handling.

V.—ACCOUNTING FOR SCRAP.

In the preceding sections, different phases of the scrap problems were outlined with the reasons given for systematic handling, etc. The ultimate aim, however, of a system for handling scrap is to obtain correct costs and prevent loss.

The following system of accounting for scrap deals with the problem in general, and is built up to fit in with the methods of physically handling scrap already described.

1. Absorbing of Scrap Losses in Costs.

Careful and intelligent application of the scrap ticket system outlined under "Reporting defective material, etc." will reveal all losses due to scrapping and permit calculation of a correct ratio of loss to product billed.

The copy of the scrap ticket sent to the cost clerk acts as a basis for summarizing all losses of material, labor and expense by lines of product. The provision of showing the order or requisition number on each scrap ticket simplifies matters in drawing a distinct line between losses incurred on special product manufactured on specific customers' orders and standard product manufactured for stock. Usually the loss on special product is chargeable direct to the cost of the order or requisition. The scrap tickets in such cases are to be stamped "absorbed in cost direct," and then filed.

All other scrap tickets are sorted and filed according to departments or lines of product. At the end of the month they are summarized on a "scrap report," provided with a column for each "cause" showing the loss of material, labor and expense. The extreme right hand column should show the total loss in each department or line of product. Directly under or next to this total there should be inserted the total cost of material consumed or the total cost of shipment of the line of product, and also the calculated ratio between the total cost of material consumed or total cost of shipments. This ratio should be added to the cost of the material consumed or the total cost of the product depending upon the basis used in calculating it. Where cost estimates are quoted on special orders or requisitions this ratio should also be considered in such estimates.

The scrap ticket form provides for separation of material, labor and expense, and deduction of scrap value, but the net loss only should be considered in costs. To calculate the scrap value correctly a list of up-to-date scrap prices should be maintained. Should the management desire to ascertain the loss for which each department is responsible, a report can be prepared, by sorting the scrap tickets and summarizing the data shown thereon according to respective departments. The scrap report should also include losses on special products.

2. Considering Scrap Value of Natural Scrap in Costs.

The "scrap report" covers only two classes of scrap, namely: defective material purchased outside and obsolete, spoiled, defec-

tive, surplus, etc., material and product but does not include the natural or common scrap.

The natural scrap can be considered in costs under two methods:

a Its cost may be calculated in the material costs of each *unit* or product, where a *large percentage* of the quantity of raw material used in one unit becomes scrap, or where the material used has a *high scrap value.* This method requires actual tests to be made by calculating the gross and net weight of a unit. The material charge minus the scrap value of the quantity scrapped becomes the net unit material cost.

b Its cost may be calculated upon a percentage basis representing the ratio of natural manufacturing scrap to the total of each kind of material or line of product.

The scrap transfer form described under "Reporting and tagging scrap" will enable the salvage department to summarize the scrap received according to departments or lines of product and to submit such summaries to the cost clerk for the calculation of the ratio of scrap credit to be allowed in material costs.

3.—Scrap Account.

The ideal method of accounting for scrap is to establish a department with a complete set of operating accounts. In this manner the salvage department would not only bear its own expense but also a pro rata share of the general expense. The same set-up can be used as that for producing departments but the elements entered would differ in the case of material and direct labor.

a.—The material account besides being debited with all scrap, would also be charged with tie wire used in baling, and other items of similar nature.

b.—The direct labor account would receive charges for all labor performed in preparing scrap for disposition.

The direct expense charges would be similar to those of producing departments and the general expense would represent a fair share of fixed charges. The respective accounts would be credited in the usual way. The principal credits would come from summaries of transfers and shipments billed. Such operating accounts would permit of close analysis and proper control of expense. They would enable the manager to determine whether too much is being expended in recovering and sorting scrap in comparison with the value received. However, it is not always practicable or feasible to have a complete set of operating accounts. Then the best substitute is to open a scrap account, debited and credited as follows:

DEBITS

a. Scrap value of material and product reported by scrap tickets. From the summary of this class of scrap submitted by individual in charge of scrap. This scrap value is to be credited to respective departments, orders, or lines or product.

b. Scrap value of all natural scrap reported by scrap transfer forms, as submitted on summary sheet by the individual in charge of scrap. The credits to be distributed as above.

c. All labor used in preparing scrap for disposition.

d. Direct expense, such as salaries and wages, of others than laborers, and also expenditures for miscellaneous small tools and supplies.

e. Pro rata share of fixed charges.

CREDITS

a. Salvage value of scrap transferred to stock or other departments, obtained from a summary of stock transfers, debited to departments, orders or lines of product at a fair value.

b. Value of scrap sold obtained from sales register covering all shipments of scrap to outside concerns.

c. Miscellaneous items.

At the end of the fiscal year, any balance in such account not representing physical scrap on hand, should be transferred to the profit and loss account.

The initial purpose of this article was to deal chiefly with fundamentals, as an attempt to lay out a specific system would fall short, in that such system would of necessity be too restrictive, debarring all features not specially included. The suggested methods, however, will permit modifications where required to meet local conditions. As a whole the use of the methods described may have some influence in perpetuating stricter conservation of materials and lead to a reduction of costs for the benefit of industry in general; and further, by inducing more efficient handling may increase the value of scrap and contribute to increased profits.

Perhaps, as a parting word it might be well to add, that scrap exists. Consequently handling it for ultimate disposition is inevitable. Makeshift handling and accounting for scrap is usually not only expensive but also precludes a rare opportunity for studying the efficiency of manufacturing operations, while the reverse is true when a well planned system is applied. It is plain, therefore, that the solution for meeting the scrap problem is an adequate system, which should have a place with other modern methods applied in well organized industries.

SUMMARY

A CONCISE VIEW OF THE SCRAP PROBLEM

1. Material purchased outside found defective, after it has been placed in production means loss of material, if not rejected, labor and expense.

2. Material and product that is defective, spoiled, obsolete, lost, etc., means loss of material, labor and expense.

3. Material such as short ends, pieces, sheets, bolts, nuts, small parts dropped and scrapped, means loss of material, if more economical use were possible and practicable, and to a lesser extent labor and expense.

4. Natural (unavoidable) scrap, i.e., borings, turnings, clippings, sweepings, etc., means that cost is but slightly affected, and there is no apparent direct loss, but, if grades become mixed, salvage value is reduced, and a corresponding loss is incurred.

5. More scrap means larger loss, higher cost and more expense.

SOLUTION

1. Prevent scrap at source by study and elimination of causes, and reclamation.

2. Handle scrap efficiently by proper segregation at point of origin, systematic collection and transportation, and preparation for profitable disposition.

3. Dispose of scrap for best returns by: maximum consumption of scrap within the factory, finding most profitable markets, and meeting the demands of consumers.

4. Account for scrap correctly by: considering losses and salvage value in costs, crediting scrap to material of individual lines of product and maintaining sufficient records for compilation of comprehensive reports.

The results will then be: less scrap by conservation of raw materials, lower costs through economies effected, less expense because the quantity of scrap handled is reduced, higher prices because of cleaner and well segregated scrap and correct accounts, whereby the material costs can be properly credited.